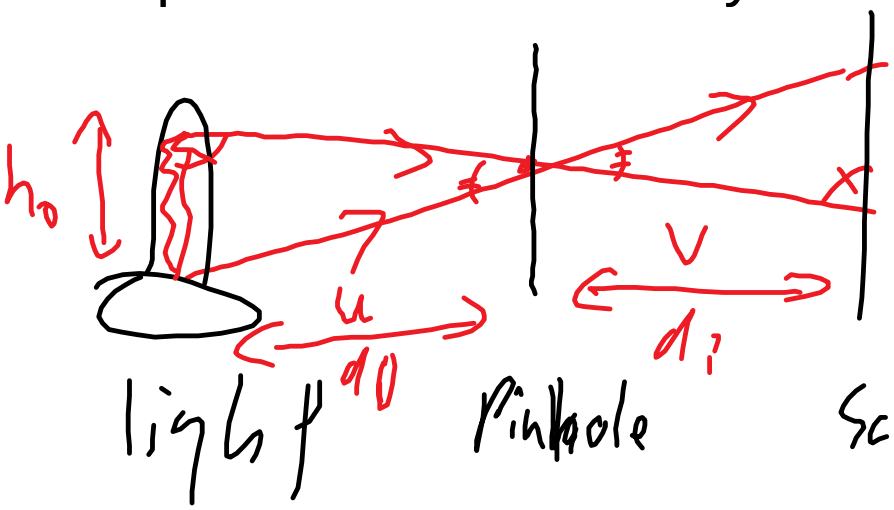
Ray diagrams
Pinhole camera, Plane Mirror, Curved Mirrors

Recap from the Lab activity:



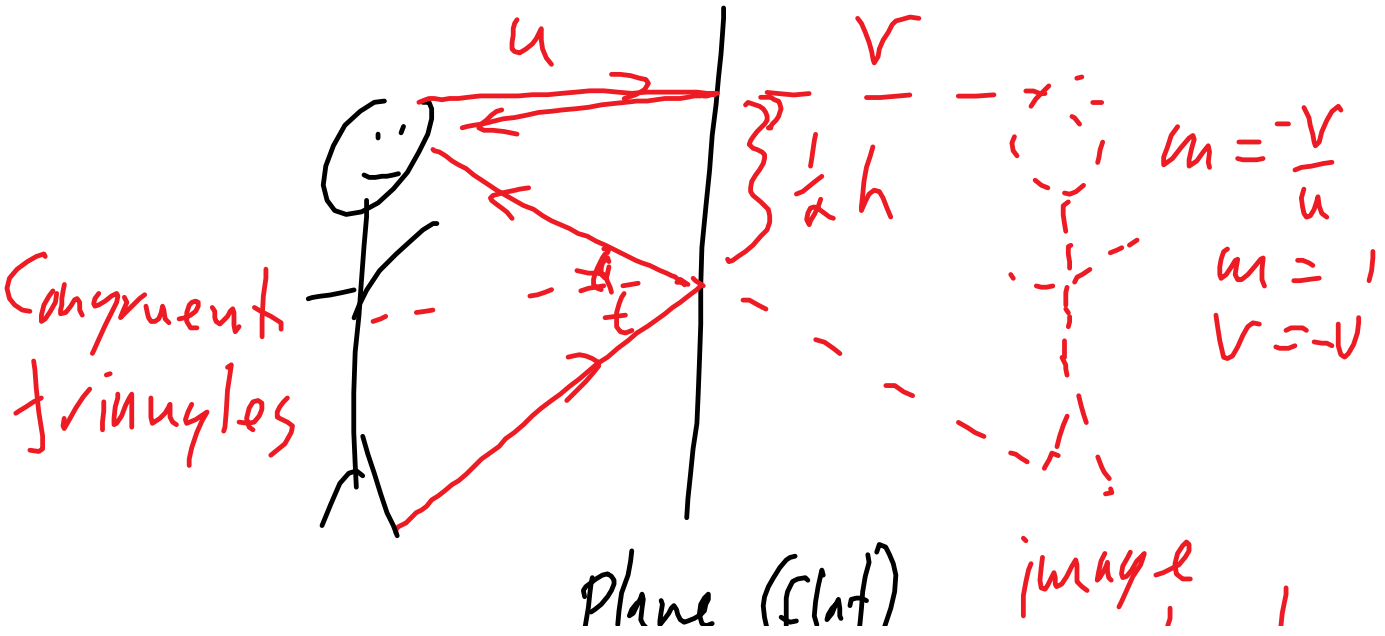
AAA
→ Similar triangles

$$m = \frac{h_i}{h_o} = -\frac{V}{u}$$

magnification, m
- inverted if negative

e.g. $m = 2.0\times$ - image = 2x object

$m = 0.5\times$



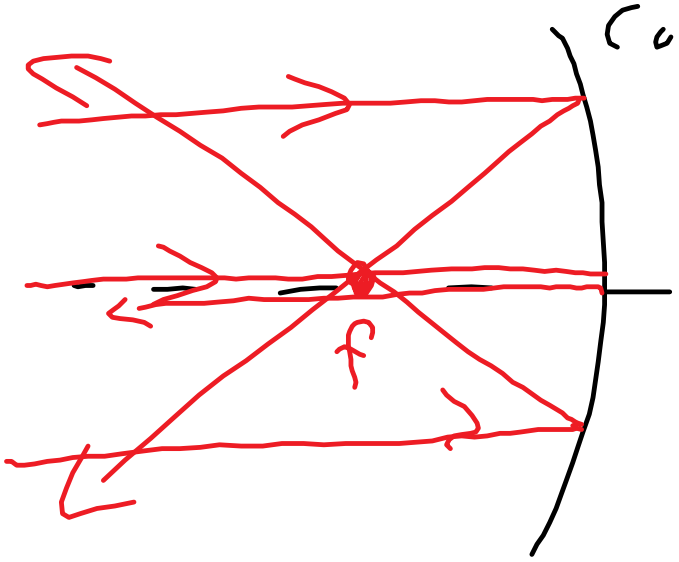
plane (flat) mirror

image
- virtual
- no light rays
- negative image distance, v

Curved Mirrors -

Convex and concave
Convex mirror - image is smaller and upright
concave mirror - image is
- inverted if the object is further than the focal point
- upright and enlarged if the object is closer than the focal point.
- not focused if the image is at the focal point.

Focal point: the point where rays parallel to the principle axis of the mirror (or lens) go to/away from.



Concave

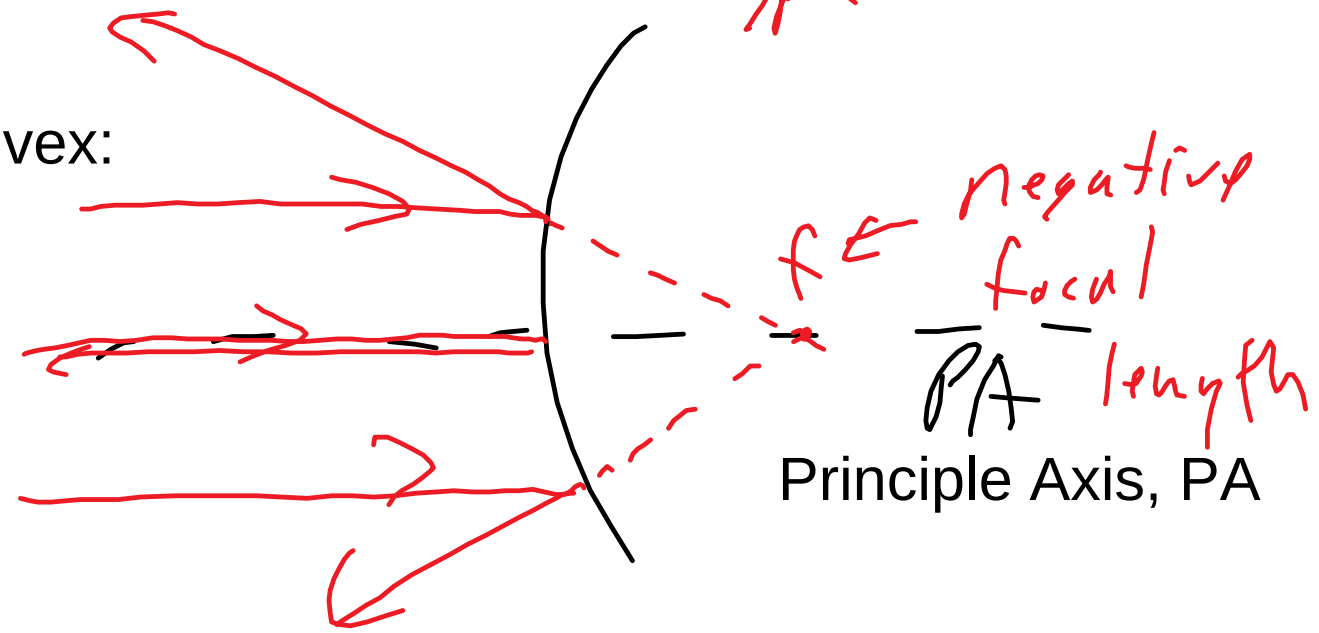
Principle axis

f is focal Point

f is about $\frac{1}{2}$ C

f is about ½ C
C is rating of curvature of the spherical mirror.

Convex:



How do you locate the image of an object in a curved mirror or lens?
2 methods: 1. scale ray diagram 2. lensmaker's equation

Rules for Ray diagrams:

1. rays parallel to the principle axis reflect/refract to or from the focal point.
2. Rays to or from the focal point reflec/refract parallel to the principle axis.
3. Rays through the vertex of a lens(PA) go straight through (thin lens)

Lensmaker's equation

$1/f = 1/v + 1/u$

and $m=h_i/h_o = -v/u$

eg. 1. You shine a filament lamp, with a 7.5 cm filament, near a curved mirror. Determine the size, location and type of image if

a) it is a convex mirror, f=-4.0 cm
b) it is a concave mirror, f=4.0 cm
c) it is a concave mirror, f= 10.0cm

using a scale ray diagram and lensmakers equation